Can silicosis explain it all?

Dear Editor,

Portugal is still the country with the highest TB incidence rate in Western Europe[1–3]; although a recent decrease in TB incidence rate has placed the country close to the low incidence goal.[2] Despite a national TB incidence rate of 21.1/100 000 inhabitants in 2013, Penafiel municipality registers the highest TB incidence rate in the whole country (83.4/100 000 inhabitants in 2013).[2] Penafiel municipality is part of Northern Portugal region (NUTS II) and it is located in a geographic area designated as Vale de Sousa. The large majority of its 28 parishes are quite industrialized, although in some of them the primary sector still represents an important part of the economy. The mining sector, particularly exploration of granite quarries, is an important economic sector in Penafiel and other neighbouring counties in the geographic region of Vale de Sousa.[4] Therefore, the large exposure of Penafiel's mining sector workforce to prolonged inhalation of crystalline silica has been pointed out has one of the major factors for TB high incidence rate in this region.[5]

In order to identify longitudinal trends of TB incidence rate in Penafiel and Northern Portugal and to describe the behaviour of silica-related diseases and other social and health-related indicators in the region, we performed a longitudinal study that included every active new TB case notified in Penafiel and Northern Portugal between January 1st, 2002 and December 31st, 2012. The data source was the Portuguese Tuberculosis Surveillance System (SVIG-TB) and the information was up-to-date until December 31st, 2012. The SVIG-TB is the notification and follow-up system of the TB cases in Portugal, supervised by the Directorate-General of Health (DGS).[6]

The socio-demographic and health-related indicators considered in this study were: (1) population density; (2) elderly dependence ratio; (3) unemployment rate; (4) immigration rate; (5) medical doctors rate; (6) mining sector work force ratio; (7) silicosis notification and prevalence rates; (8) HIV notification and HIV/TB coinfection rate; (9) Addiction related TB rate; (10) Immigration related TB rate; (11) Homelessness related TB rate; (12) Incarceration related TB rate.

For all predictors, data were collected yearly and obtained from the following national institutions: Statistics Portugal (INE), Employment and Vocational Training Institute (IEFP), Directorate General of Prison Services (DGSP), Institute on Drugs and Drug Addiction (IDT), Institute of Social Security (ISS), Directorate General of Energy and Geology (DGEG) and National Health Institute Doutor Ricardo Jorge (INSA).

TB incidence rate and other incidence rates are expressed as the rate per 100 000 inhabitants. A time-trend descriptive analysis was carried out to substantiate the dynamics of the TB incidence and other collected data in both regions over the study period.

During the period studied, a total of 675 new TB cases were notified in Penafiel, with an average decrease of the TB incidence rate of 1.41% per year (from 95.5/100 000 inhabitants in 2002 to 82.1/100 000 inhabitants in 2012). In the same period, a total of 16 364 new cases were notified in Northern Portugal, with a similar average decrease of 1.19% per year (from 35.8/100 000 inhabitants in 2002 to 24.4/100 000 inhabitants in 2012).

As expected, a declining time-trend for the TB incidence rate was exhibited by both regions during the studied period. Socio-demographic and health-related indicators of both regions are presented in Table 1.

From a socio-demographic point of view and in comparison with Northern Portugal, Penafiel municipality presents a higher population density, a lower elderly dependency ratio and a much lower number of medical doctors. As previously mentioned, mining industry is a strong economic sector in Penafiel; therefore the proportion of mining workers in the population is frankly above the rest of the Northern Portugal region, with a subsequent significantly higher silicosis notification and prevalence rates in Penafiel, with the latter presenting an increasing trend during our study period. The same increasing trend was reported for new cases of silicotuberculosis in Penafiel, while over the same period Northern Portugal values remained stable.

As for the other TB related risk factors, although HIV notification rates are similar between both regions, Penafiel reports a lower HIV/TB co-infection rate, as well as lower notification rates for all other TB related risk factors collected (immigration, incarceration, addiction and homeless).

Our study confirms that among all TB related risk factors, silica-related diseases indicators are the ones where both regions coherently differ, with Penafiel presenting higher silicosis notification and prevalence rates, and silicotuberculosis notification rate. All other collected TB related risk factors (HIV, immigration, incarceration, addiction and homelessness) presented lower values in comparison with the Northern Portugal region.

Other collected social and health-related indicators, like higher population density and lower number of medical doctors, might also play an important role in Penafiel's higher TB incidence.

Table 1 Relevant socio-demographic and health-related indicators of Penafiel and Northern Portugal.

	Years										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Population density (per km^2)											
Northern Portugal	187.8	188.1	188.2	191.4	191.5	191.6	191.2	190.9	190.3	190.0	189.0
Penafiel	340.3	341.2	342.2	342.7	343.0	343.1	342.5	341.7	340.8	340.3	338.5
Elderly dependency ratio (%)											
Northern Portugal	21.5	21.8	22.2	22.5	22.8	23.1	23.5	24.0	24.8	25.3	25.9
Penafiel	15.9	16.1	16.4	16.6	16.6	16.6	16.8	17.2	17.8	18.2	18.5
Unemployment rate (%)											
Northern Portugal	4.0	5.0	5.4	5.7	5.4	4.6	4.9	6.0	6.2	6.7	7.8
Penafiel	2.8	3.8	4.1	3.9	3.5	3.2	3.7	5.2	5.3	6.4	8.0
Immigration rate (%)											
Northern Portugal	n/a	n/a	n/a	n/a	n/a	n/a	1.31	1.38	1.39	1.44	1.38
Penafiel	n/a	n/a	n/a	n/a	n/a	n/a	0.55	0.56	0.54	0.47	0.42
Medical doctors (per 100 000)											
Northern Portugal	281.6	288.5	296.6	306.8	315.4	324.5	335.0	347.1	362.3	376.0	385.2
Penafiel	84.5	87.0	85.4	89.4	92.0	96.1	100.4	113.1	130.0	142.6	142.0
Mining sector work force (per 100 000)											
Northern Portugal	75.7	73.7	75.1	71.0	79.2	71.0	59.8	56.1	59.8	61.1	56.7
Penafiel	886.1	748.4	797.1	732.8	236.3	410.6	517.3	547.4	634.6	630.0	483.0
Silicosis notification rate (per 100 000)											
Northern Portugal	4.3	4.3	6.6	3.7	2.1	2.7	2.6	3.1	2.1	2.4	2.4
Penafiel	54.0	69.0	125.3	83.9	50.8	107.1	78.4	80.0	89.9	112.1	84.9
Silicosis prevalence rate (per 100 000)											
Northern Portugal	78.5	78.2	80.0	88.0	85.3	82.3	79.6	76.5	73.9	70.9	67.9
Penafiel	560.8	588.2	645.7	730.1	739.1	788.3	803.5	834.3	875.2	901.3	959.0
Silicotubercolsis (% of total TB cases)											
Northern Portugal	0.8	0.4	0.2	0.4	0.6	0.7	0.7	0.7	0.6	1.9	0.8
Penafiel	0.0	1.5	0.0	0.0	4.5	4.2	7.6	12.1	3.6	10.0	8.5
HIV notification rate (per 100 000)											
Northern Portugal	15.9	15.1	14.9	13.9	13.0	12.4	12.3	10.3	9.3	7.4	7.4
Penafiel	8.3	8.3	11.0	11.0	11.0	11.0	8.3	8.3	6.9	15.2	12.5
HIV/TB co-infection (% of total TB cases)											
Northern Portugal	13.3	14.6	13.1	12.9	11.7	11.5	10.8	10.9	7.6	7.8	7.7
Penafiel	4.3	4.5	6.2	5.8	3.0	6.3	1.5	1.7	1.8	1.4	0.0
Addiction related TB (% of total TB cases)											
Northern Portugal	28.1	23.4	22.3	24.6	24.8	24.6	20.4	20.8	19.8	18.2	17.7
Penafiel	13.0	14.9	13.8	11.5	15.2	12.5	7.6	6.9	9.1	15.7	20.3
Immigration related TB (% of total TB cases)											
Northern Portugal	2.7	2.6	2.4	3.5	2.7	3.3	3.4	4.1	4.2	4.5	4.3
Penafiel	0.0	0.0	0.0	0.0	0.0	2.1	0.0	1.7	0.0	0.0	1.7
Homeless related TB (% of total TB cases)											
Northern Portugal	2.8	3.6	3.8	4.5	4.4	3.8	2.7	2.8	3.2	3.3	3.0
Penafiel	1.4	1.5	1.5	1.9	1.5	0.0	0.0	0.0	0.0	1.4	1.7
Incarceration related TB (% of total TB cases)											
Northern Portugal	1.1	0.4	0.7	1.2	0.9	0.9	0.9	0.9	1.0	0.9	1.5
Penafiel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Author contributions

Raquel Duarte and A. Rita Gaio conceived the project idea. Daniel Coutinho and Pedro Sousa collected the data. Olena Oliveira and A. Rita Gaio conducted the analyses. All authors interpreted and discussed the results. All authors wrote the manuscript. All authors have read and approved the final version.

Conflicts of interest

The authors have no conflicts of interest to declare.

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Portuguese Pulmonology footprint in Europe: From abstracts to papers and grants

To the Editor,

Now that the Portuguese Journal of Pulmonology has reached the highest impact factor of the national medical journals,[1] it is worth analyzing other indicators of national respiratory research.

To be widely recognized as a mature medical society and specialty, Pulmonology needs to leave a distinct international footprint.

What image does the Portuguese Pulmonology present to the international arena?

Participation in the European Respiratory Society (ERS) Congress

Portuguese participation in the ERS has been increasing in recent years (Fig. 1) reaching in 2015, 2.1% of accepted abstracts. However this number is below the European representation of other Portuguese societies; it is even lower than that of Greece in 2006 (Greece in 2006, 13.7 abstracts per million inhabitants versus Portugal in 2015, 8.8 abstracts per million inhabitants).[2]

During 2015, the ERS meeting in Amsterdam had 23.293 participants, 317 of which were Portuguese (1.4%). Out of the 5088 abstracts submitted, 136 were sent from Portugal (2.7%); Total acceptance rate was 79% while the acceptance rate of Portuguese abstracts was 63% very close to India (61%) and Egypt (63%) (Fig. 2).

Bibliometry of respiratory medicine research

According to the report from General Directorate for education and health statistics[3] (Direção Geral de Estatísticas de Educação e Ciência) for Pulmonology, in 2012, the number of publications indexed in Web of Science was 5.88 per million inhabitants, only better than Luxembourg and a long way from Holland the leader in Europe with 22.95 publications per million inhabitants. Since 2007, indexed publications on